Russell, A. E., Moore, D. A., & Ford, T. (2016). Educational practitioners' beliefs and conceptualisation about the cause of ADHD: A qualitative study. *Emotional and Behavioural Difficulties*, *21*(1), 101-118. https://doi.org/10.1080/13632752.2016.1139297

Educational practitioners' beliefs and conceptualisation about the cause of ADHD: A qualitative study

This is an Accepted Manuscript of an article published by Taylor & Francis in Emotional and Behavioural Difficulties on 1st February 2016, available online: http://www.tandfonline.com/doi/10.1080/13632752.2016.1139297.

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Acknowledgements

The authors thank Sophie Arnell and Marianne Tay for their help with data collection for this project, and Ginny Russell for her continuing support and advice. This research was supported by the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care South West Peninsula at the Royal Devon and Exeter NHS Foundation Trust. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health. This study was funded by a University of Exeter Medical School PhD studentship.

Declaration of Conflicting Interests

None.

Abstract

Objectives: Educational practitioners play an important role in the referral and treatment of children with attention-deficit/hyperactivity disorder (ADHD). This study aimed to explore how educational practitioners' conceptualise their beliefs about the causes of symptoms of ADHD. Method: 41 educational practitioners from schools in the UK participated in focus groups or individual interviews. Data were analysed using thematic analysis. Results: Practitioners' beliefs fell into two categories: biological and environmental. Practitioners conceptualised the causes of ADHD in lay-theoretical models: a 'True' ADHD model considered that symptoms of ADHD in many cases were due to adverse environments; and a model whereby a biological predisposition is the root of the cause of the child's symptoms. Conclusion: Differential beliefs about the causes of ADHD may lead to practitioners blaming parents for a child's behaviour and discounting ADHD as a valid condition. This has implications for the effective support of children with ADHD in schools.

Keywords: ADHD, teachers, schools, theory, mental health

Introduction

Scientific understanding of causes of ADHD

Current understanding of the causes and aetiology of attention deficit/hyperactivity disorder (ADHD) considers the interaction of a network of biological, psychological and social factors, with a strong genetic predisposition that may be differentially expressed (Faraone et al. 2015). These factors may interplay to increase or decrease risk of ADHD. ADHD is also considered as a dimensional disorder where symptoms can be considered a trait-like measure rather than as a distinct category (Shah and Morton 2013). The inter-relationship between genetic and environmental risk factors has led to the suggestion that it may be unhelpful and incorrect to dichotomise genetic/biological and environmental explanations at all (Thapar et al. 2013). Despite this, much research has focused on disentangling these two influences (Knopik et al. 2006; Nikolas and Burt 2010), although researchers more recently have promoted the study of gene-environment interactions (Ficks and Waldman 2009; Rutter, Moffitt, and Caspi 2006). Evidence is mounting for environmental moderation of genetic influences on ADHD (Nikolas, Klump, and Burt 2015) and although ADHD is still considered to be influenced by heritable factors, environmental factors at home and school may amplify or diminish the development and/or the impact of ADHD symptoms (Tarver, Daley, and Sayal 2014). Thus, current research suggests that the causes of ADHD are complex, multi-dimensional and interacting.

ADHD and school

Children spend much of their lives in school. As educational practitioners often work with large numbers of children, they are aware of developmental norms and are well-placed to recognise when a child is struggling, either academically or socially. Therefore educational practitioners play an important role in referral of children for potential diagnosis of ADHD. Educational practitioners are also well placed to deliver treatment to support these children in a setting where

inattention, restlessness and impulsivity pose particular challenges. Phillips (2006) frames teachers' involvement as 'sickness and treatment broker' (p433) as well as 'an informal role as disease-spotters' (p434). The UK's National Institute for Health and Care Excellence (NICE) clinical practice guidelines recommend that teachers who have received training about ADHD and its management should provide behavioural interventions in the classroom to help children and young people with ADHD (NCCMH, 2011).

Educational practitioners are key in identifying when children may have ADHD and communicating this to parents, however their beliefs about the cause of these symptoms may impact on whether they advocate referral of children with suspected ADHD (Hillman 2011). When considering a diagnosis of ADHD, medical professionals investigate whether the symptoms occur across settings, thus multiple perspectives on a child are often sought. Lee (2008) asked early childhood teachers in the USA about their interactions with the parents of children with ADHD symptoms, and all had experience of liaising with parents who viewed their child's behaviour differently to the teacher, emphasising the need for multiple perspectives to inform understanding of the problems the child is experiencing.

Educational practitioners' beliefs about what underpins ADHD behaviour may affect the use of any teacher-led interventions in school (Vereb and DiPerna 2004). It has been suggested that if the treatment recommended by healthcare professionals is in line with teachers' beliefs, teachers are more likely to implement and adhere to it (Eckert and Hintze 2000). This applies to both medication and behavioural management for children with ADHD, and may impact on the effectiveness of school-based interventions and strategies used in order to facilitate the progress of the child (Moore et al. 2015). If practitioners are unaware of causes of ADHD or endorse

beliefs that lead them away from using school-based interventions recommended for children with ADHD, this can have long term impacts on the child's achievement and well-being.

Existing research

Teachers' knowledge of the causes of ADHD has been explored in quantitative research, which suggests that many teachers endorse biological and medical models of ADHD, and do not typically believe that it can be caused by poor parenting (Anderson et al. 2012; Bekle 2004; Couture et al. 2003). The majority of qualitative research exploring the causes of ADHD samples parents rather than teachers. For instance, Harborne, Wolpert, and Clare (2004) interviewed ten parents who had sons with ADHD. They found that parents believed the causes of ADHD to be biological in nature; however they felt that others (including teachers) believed the cause to be poor parenting, leading parents to feel blamed.

One study used vignettes (written descriptions of an often-hypothetical child) and open-ended questions to explore what teachers believe is the cause of a child's problem behaviour (Hillman 2011). Hillman found that responses fell into two categories: medical and non-medical, although she did not discuss whether teachers endorsed both categories or had polarised beliefs (Hillman 2011). Vignette studies such as these leave little room for exploration of what teachers experience in their day-to-day work with real children with ADHD, however there is limited research of any kind in this field. Einarsdottir (2008) interviewed 16 Icelandic teachers about their experiences around ADHD. The teachers expressed the opinion that ADHD was innate within the child. The teachers further distinguished between a 'badly behaved' child and a child with ADHD by whether, given time, the child could and would learn the rules of the school. Lee (2008) found that three of ten teachers interviewed about ADHD suggested that in their experience ADHD was more often found in children from socioeconomically disadvantaged

backgrounds, and the notion of a child having ‘no structure at home’ was also mentioned. This reflects quantitative findings that ADHD is more prevalent in socioeconomically disadvantaged groups (Russell, Ford, and Russell 2015).

A recent review of non-pharmacological interventions for ADHD notes the gap in research conducted in the United Kingdom (UK) surrounding teachers’ beliefs about the causes of ADHD (Richardson et al. 2015). Previous qualitative research with teachers has been conducted in the USA, Iceland, and Korea. To our knowledge the current study is the first to explore these issues in the UK. Existing studies are limited by a narrow age range of children taught (often ages 4-7) and have not explicitly explored educators’ beliefs about the children with ADHD they have worked with. Previous research is often restricted to teachers rather than other educational practitioners who have experience working with children with ADHD in schools. In addition, educational practitioners have a wealth of first-hand experience of children with ADHD symptoms, and their insights, beliefs and theories about the causes of ADHD may be captured to usefully inform current research directions about causes and nosology of ADHD.

Aims of the current study

The current study therefore aims to use qualitative research methods in order to address a topic that we know little about: how do educational practitioners in the UK conceptualise the causes of ADHD? The study also aims to go beyond some previous research to include views of the wide range of educational staff who may work with children with ADHD within their job role, for example teaching assistants (TAs), head teachers, pastoral care workers and special educational needs and disabilities co-ordinators (SENDCo’s) in addition to teachers. This is in order to capture the experiences of the full range of practitioners who work with children with ADHD in the school setting. There are two specific research questions:

1. What do educational practitioners believe are the causes of symptoms of ADHD?
2. How do educational practitioners conceptualise these causes?

Methods

Participants

Participants were 41 educational practitioners that self-identified as having worked with children or young people with ADHD, recruited from 223 schools in the South West of England. Schools were approached either by email from the lead researcher to a named contact or through a newsletter. If a school expressed interest in participating, a named contact, often the head teacher or SENDCo, acted as gate-keeper and liaised with the researcher in identifying staff with relevant experience who were interested in participating.

Practitioners were recruited from three types of school; primary (ages 4-11), secondary (ages 11-18) and pupil referral units (PRUs; also known as alternative provision, for pupils excluded from mainstream education, ages 5-18). Practitioners had a range of educational roles: 11 were teaching or learning support assistants (LSAs); 18 were teachers, team leaders or head of year; six had responsibilities as SENDCo's; three were involved in pastoral support for students; three were deputy head teachers and two were head teachers. There was a wide range of experience represented across practitioners: the average length of experience was 14 years (range 0-35 years). Nine practitioners were male. Practitioners could not recall precisely how many children they had worked with that had a diagnosis of ADHD, although estimates ranged from 1-40. Most practitioners stated that over their career they had worked with many more children

who had symptoms of ADHD but had no formal diagnosis that practitioners were aware of. Table 1 supplies a summary of participant information.

Table 1: Characteristics of participants

Characteristic	**N**
Female	32
Primary	19
Secondary	7
PRU	15
Worked with ages 0-4	14
Worked with ages 5-11	33
Worked with ages 11 and up	25
Worked with <10 children with ADHD diagnosis	13
Worked with ≥10 children with ADHD diagnosis	12
Teacher	16
TA/LSA	11
Co-ordinator or team leader or head of year	11
Pastoral support	3
SENDCo	6
Head/deputy head teacher	5

Notes: Numbers may not add up as several practitioners had several roles within the school and some had worked with a large range of age groups. TA: Teaching assistant, LSA: learning support assistant, SENDCo: special educational needs and disabilities co-ordinator

Data collection

41 practitioners took part in either one of six focus groups or three individual interviews. We used focus groups where there was more than one participant from a school, otherwise individual interviews were conducted. Focus groups had on average seven practitioners. Interviews and focus groups took place at the school where the practitioners worked; with minor exceptions based on participant request and convenience. The use of focus groups in combination with individual interviews in qualitative research is well established (Morgan 1996). Focus groups allow breadth of experience and views around a topic to be elicited as well as exploring mutual experiences and understandings. Interviews can explore individuals' experiences and views in greater depth, thus the two techniques complement each other to allow for a rich understanding of both individual experiences and beliefs, and how these are understood and expressed in the wider social context of the school (Michell 1999; Bauer, Yang, and Austin 2004).

Each interview or focus group lasted between 40 minutes and one hour, the length was determined by the amount of time practitioners had available. Both interviews and focus groups followed the same topic guide which covered various areas of experiences working with children with ADHD, including what practitioners believed about the causes of ADHD, and were semi-structured. Practitioners provided informed consent before taking part and were given the opportunity to choose a pseudonym to be used for the study analysis and write-up. The University of Exeter Medical School research and ethics committee provided ethical approval for this study.

Procedure

All focus groups and interviews were conducted by the lead author (AER), who has prior experience working as a TA in a specialist school, and an academic background in psychology. In focus groups she was assisted by one of two psychology undergraduate research students who took field notes in order to aid later transcription and to ensure all topics were covered. To encourage participation and discussion in focus groups all practitioners were encouraged to express their views, and at the end of each focus group or interview practitioners were given an explicit opportunity to add or raise any other issues they wished to discuss. Incentives were not provided with the exception of light refreshments during the session.

Analysis

Audio recordings were transcribed verbatim by the two research students and transcriptions were checked by AER prior to data analysis. Transcripts were then read and re-read by AER and DM. Data were analysed using thematic analysis as outlined by Braun and Clarke (2006). Thematic analysis is a flexible method for analysing qualitative data that assumes no specific epistemological or theoretical approach and can be used to identify, analyse and organise repeating patterns within data. There is a focus on identifying features of the data, known as codes, then organising these into patterns of responses related to research questions, known as themes (Braun and Clarke 2006). In order to generate initial codes AER and DM first read and discussed two focus group transcripts to generate an initial overarching coding framework. AER and one of the two research students then independently coded each transcript within this framework, which also allowed space for new codes to be generated. Coding each transcript twice increased the reliability of the analysis. This coding was amalgamated using

NVivo version 10 with similar codes or synonyms being merged and novel codes preserved in order to retain the maximum level of detail at this stage.

The coded data were grouped into tentative themes and subthemes by AER and DM. These were reviewed to ensure that collated extracts formed a pattern and we explored whether these themes appeared credible in the context of the entire data set as well as ensuring that all data relevant to a theme had been coded appropriately. This process continued in an iterative manner until a thematic map was drafted. Themes were clearly defined in order to identify and describe their core aspects. Although this process is described linearly, in actuality analysis was cyclical and reflexive (Braun and Clarke 2006).

Results

The thematic analysis identified six themes relevant to the two research questions. Themes and key findings are summarised below in Table 2.

Table 2: Research questions, themes and key findings

Research Question	Theme	Findings
What do educational practitioners believe about the causes of ADHD?	Biological	Practitioners put forth a variety of biological attributions for the causes of ADHD including those based in the brain and genetic causes. Practitioners displayed a lack of detailed knowledge about these biological attributions.
	Environmental	Practitioners commonly attributed the cause of ADHD behaviours to be due to the home or parenting. Others mentioned diet as an exacerbating factor. Practitioners infrequently discussed the role of the school context in the child's symptoms.
How do educational practitioners conceptualise the causes of ADHD?	'True' ADHD	Practitioners in several focus groups put forward the theory of there being a true or pure ADHD that is biologically caused, rarely seen in their experience, and the child is perceived to have no volitional control over their symptoms. This is positioned at one end of a continuum, with the other end being environmentally-caused ADHD.
	Environmental ADHD	This is the other end of the spectrum from True ADHD. Environmental ADHD was discussed by a number of practitioners as being a misdiagnosis of ADHD, the symptoms of which were caused entirely by the environment and thus were not truly ADHD. Practitioners believed this to be the most common cause of ADHD behaviour that was seen in their particular school.
	Biology exacerbated by environment	The majority of practitioners believed that ADHD was caused by biological factors; however the impacts of this predisposition could be exacerbated or ameliorated by the environment in which the child is raised.

Environment becoming biology	Some practitioners discussed a critical or sensitive period early in childhood where negative experiences due to the environment could become biologically entrenched and therefore lead to ADHD as a biological manifestation

1. What do practitioners believe about the causes of ADHD?

Most practitioners discussed ideas around both biological and environmental causes for ADHD and factors that exacerbate or ameliorate symptoms. These were, however, differentially endorsed and expressed, with biological factors most frequently assumed to be the main cause of ADHD. Practitioners described these biological factors as being 'in the brain' or genetic. However, compared to biological causes, practitioners discussed environmental factors for longer, and in more detail and depth. In terms of environmental causes for symptoms, practitioners had more elaborate views that included areas of home and parenting, diet and school. These views mirror those reported by Hillman (2011), who categorized beliefs into 'medical' (in this case biological) and 'non-medical' (environmental) viewpoints. In this study practitioners did not often consider these polarised views as mutually exclusive and were accepting of colleagues with opposing views within focus groups.

Biological

Many practitioners acknowledged ADHD as a disorder with a biological cause, as Rose summarises: '*Well it has to be biologically caused if we're going to give it a medical label doesn't it really' (teaching role: SENDCo, school type: Secondary).* When practitioners spoke about the biological basis for ADHD they distinguished between neurological deficits, including

imbalances of neurotransmitters, and genetics. Practitioners were explicit about their lack of detailed knowledge about the biological causes of ADHD; Tarquin finishes a discussion with colleagues about the possibilities: *'yeah, I dunno if genetics affects it or what… you know, some sort of biological thing' (deputy head teacher, PRU).*

In the brain. The majority of practitioners discussed biological or neurological causes, with attributions for symptoms being varied. Practitioners provided explanations that clearly situated the cause of ADHD as neurological: *'I think it's partly just the way the brain sort of fires off really' (Janet, teacher and co-ordinator, Secondary).* Hannah discusses this further: *'I have heard…that brain scans can show a difference in the brains of people with ADHD and people without' (LSA, Primary).* Occasionally practitioners explicitly based their assumptions on the basis that methylphenidate/Ritalin is given as a treatment for ADHD, thus assuming that ADHD has a neurological basis:

> *'I assumed it's some sort of chemical imbalance, I've always assumed that because then if you give them Ritalin which is a chemical it affects, it in some way it calms that' (Briony, SENDCo, Secondary).*

Genetic. Some practitioners mentioned that the causes of ADHD are '*like a genetic thing' (Tarquin, deputy head teacher, PRU).* Others mentioned the heritability of ADHD, for example Victor discusses children who are strikingly like their parents: *'they were literally carbon copies of each other and you think is that in the gene pool somewhere possibly' (teacher and co-ordinator, Primary).* As ADHD known to be highly heritable (Faraone et al. 2015), it is likely that a substantial proportion of children with ADHD have a parent with ADHD. When practitioners describe ADHD as running in families, these influences on the child may be a

mixture of genetics compounded by the environment created by the parent, who may struggle with maintaining routine and consistency due to their symptoms (Weiss et al. 2000).

Lack of knowledge. In discussing biological causes of ADHD, practitioners often used vague language or stated that they were unsure, reflecting their lack of expertise on the subject. Kitty frames this as a lack of sufficient qualification: *'I wouldn't be qualified to say what that [medical/genetic element] was and where you draw the line' (SENDCo, Primary, author edits in square brackets).* This reflects findings of studies with parents, who report that they do not know about causes of ADHD (Bussing et al. 2003). Practitioners in the current study often discussed ways in which they attempted to acquire this knowledge, be it asking colleagues, reading research or from the wider media:

> *'One of the teaching assistants at school has an ADHD son and I asked her what she thought the causes were' (Ellen, teacher and co-ordinator, Primary);*
>
> *'[I] watched a documentary on it; it's about a woman who had a diagnosis' (Victor, teacher and co-ordinator, Primary).*

Neurological and genetic research into ADHD suggests high heritability, genetic links to neurotransmitters and anatomical differences in structural and functional brain imaging (Cortese et al. 2012; Faraone et al. 2005). However, these are not sufficiently elucidated to inform assessment and intervention so perhaps this lack of detailed knowledge is unsurprising.

Environmental

The majority of discussion around the subject of what causes ADHD symptoms was environmentally focussed, with elaborate and specific references to environment being common. Perhaps this was because practitioners felt they had sufficient experience and knowledge to

elaborate on environmental causes. The environment was sometimes talked about in the context of ameliorating symptoms:

> *'I think it can be exacerbated by various environmental factors, like…how much support, emotional support and guidance kids are given and probably also diet' (Hannah, LSA, Secondary).*

Environmental causes and exacerbating factors mentioned by practitioners included home/parenting; diet; and school, which are discussed in the following subthemes.

Home/parenting. A number of practitioners talked about parents and the home environment as being the cause of many of the behaviours seen in children with ADHD: *'I would say it was to do with upbringing or amount of contact with parents' (Kate, TA, Primary).* This attribution was often framed negatively: *'It could be bad parenting, it could be absent parenting' (Sally, TA, Primary); 'What he's…come from and experienced is really quite crippling for any child' (head teacher, Primary).* This finding is in contrast to previous research, where teachers and education students were more likely to endorse statements that placed the cause of ADHD as biological rather than consider parenting as a cause (Bekle 2004; Couture et al. 2003).

There were instances where practitioners were empathetic towards parents, whilst still holding them responsible for their child's symptoms, as Ryan sympathises:

> *'the parents of these children are just people as well who come with their own baggage…you may see that parent doing things which aren't healthy and aren't great for the child, actually maybe it's because they're struggling to really make sense of how to parent as well' (pastoral leader, Primary).*

This resonates with literature around the challenges of parenting a child with ADHD, and the criticisms and stigma endured by such parents (Peters and Jackson 2009), as well as parents' opinions that others blame them for their child's difficulties (Harborne, Wolpert, and Clare 2004).

Most of the practitioners who blamed environmental factors considered the behaviours shown by the children to be learned from home, Sparky sums up her experiences:

> *'All the children that I've worked with ADHD, my opinion would be that it's very…learnt behaviours from birth, in the sense that they have no structure, they have no boundaries, they haven't ever learnt to sit still and listen…and then they can't cope later on in life with sitting still and listening' (deputy head teacher, Primary).*

Diet. Although practitioners did not often explicitly name diet as a cause of ADHD, it was discussed several times due to the perceived role practitioners thought it plays in exacerbating children's hyperactive behaviour, as Kate emphasises: *'If you gave them certain foods, they would be completely uncontrollable and you would not have any…sort of ability to keep up with them' (TA, Primary).* In a different school setting Bryony reflects on the same issue: *'We've got some of course that possibly have ADHD behaviours but have a high sugar intake…which cannot be helping [their] behaviours' (teacher, PRU).* Whilst empirical evidence has shown no causal association of diet with ADHD, the current findings are in line with evidence that fatty acid supplementation and exclusion of artificial food colourings may be effective methods for improving symptoms of ADHD (Bloch and Qawasmi 2011; Sonuga-Barke et al. 2014).

School. Few practitioners mentioned the role that school can have in creating or

exacerbating behaviours. Aspects of the school that practitioners did speak about included school context, classrooms, peers and particular lessons. TAs were most likely to discuss the implications of context on behaviour; Jemima presents a broad view: *'I don't think classrooms are necessarily the best, they are not set up really…to suit children, they're set up to suit adults' (TA, PRU);* whereas Alice discusses specific examples where she sees her pupil's behaviour worsen: *'German lessons…because it's a language lesson they are encouraged to call out things…and that's when she goes completely…hyper' (LSA, Secondary).* This lack of explicit mention of the school context by teachers is found in other research (Gwernan-Jones et al. 2015). Potential explanations for this are that because practitioners are unable or unwilling to alter this context they do not discuss its role in children's behaviour. This might explain why it is practitioners in support roles who are more likely to acknowledge the role of school in ADHD symptoms. Alternatively, because school practitioners are immersed in the same context as the child, they may not see how this context impacts the child's behaviour (Gwernan-Jones et al. 2015).

2. How do educational practitioners conceptualise the causes of ADHD?

Practitioners went further than listing simple causal factors of ADHD as discussed in section 1. We now describe how practitioners theorise how this range of causes fit together in the context of their experiences with students with ADHD. These lay-theories about the precise causes of ADHD and what exactly should be diagnosed as ADHD are interpreted in this section. These ideas include a continuum with 'True' ADHD at one end and Environmental ADHD at the other, as well as alternative theoretical explanations: Biology exacerbated by environment and Environment becoming biology.

Extremes of the spectrum: 'True' ADHD and environmental ADHD

Several focus groups discussed the idea of there being a pure, real or true form of ADHD that would be characterised by several aspects. Practitioners considered true ADHD as:-

- biologically caused/innate: '*true ADHD people who have either got a chemical imbalance or the genetic disposition*' (Kate, TA, Primary)
- rarely seen: '*Probably about 10% of the children [with ADHD have] that pure*' (Tommy, teacher, Primary)
- the child has a perceived lack of control over their behaviour: '*Those that seem not to be able to help themselves*' (unknown, Primary)
- symptom intensity is severe: '*really active or…extreme [symptoms]*' (Katie, SENDCo, Primary).

This 'true' ADHD is considered to represent *'The end of the end of the continuum' (Victor, teacher and co-ordinator, Primary)* of ADHD-like behaviours. Practitioners describe this type of 'true' ADHD as pure, or high, contrasting with other literature where pure ADHD is defined as when a child has no coexisting disorders in addition to their ADHD (Kadesjö and Gillberg 2001).

At the far end of the spectrum away from 'true' ADHD, practitioners consider there to be ADHD that is currently clinically diagnosed yet is caused by the environment:

> *'A lot of the children that I've worked with who've had that diagnosis…a lot of it I would say was to do with upbringing or amount of contact with parents or…almost like attachment' (Kate, TA, Primary).*

Several practitioners express the opinion that if this is indeed the cause, a diagnosis of ADHD should not be given, either because a developmental or attachment-related disorder is more appropriate, or because they consider this as labelling bad behaviour with no evidence of a medical cause:

> *'I wonder if it is misdiagnosed and I see similarities between children with ADHD and children with developmental disorders, ones that have had trauma in their lives, family breakdowns, mothers not always there' (Laura, student support co-ordinator, Secondary)*

> *'It would be nice if it was a medical problem you could then call it ADHD and if it wasn't a medical problem and you grew up and you've learnt it or something, it's just "you're a little bit naughty"' (Tommy, teacher, Primary).*

Only one participant overtly rejected ADHD as a concept, with practitioners in general having *'no doubt ADHD exists' (Laura, student support co-ordinator, Secondary)*; this contrasts with findings that 20% of SENDCo's surveyed in the UK in 2008 did not believe that ADHD is a 'real' neurological condition (O'Regan 2009). This may be due to increased social visibility of ADHD or to an increase in rates of diagnosis (Akinbami, Liu, Pastor, & Reuben, 2011; Atladottir et al., 2015).

One method that practitioners used to differentiate between true and not-true ADHD was to speculate: for example Tommy questions his colleagues *'and if that child had been taken at birth and given to another parent, would that child mentally be different?' (teacher, Primary).*

Webb (2013) puts forward the idea that there may be two discrete aetiological pathways to ADHD: one due to genetics, and the other due to severe adverse childhood experiences. Practitioners' theory of 'True' ADHD reflects these two groups. However, unlike the

practitioners that endorsed 'True' ADHD, Webb also acknowledges that there will be a group of children who overlap, those who have a genetic predisposition toward ADHD-like behaviours and environmental factors which exacerbate this. This is reflected in the findings of a separate theory proposed by practitioners, described in the following theme (Biology exacerbated by environment).

Biology exacerbated by environment

Many practitioners conceptualise ADHD as being caused by a biological entity, but state that environmental conditions that the child grows up in can ameliorate or exacerbate their behavioural problems: Alice describes her own theory: *'it's something that you're born with …however I think that home situations can improve it or make it worse' (LSA, Secondary).*

In general, practitioners talked more about the exacerbating factors than those that may help the child overcome the problems:

> *'it's genetic and then the way you're brought up your sort of channelled in the right direction …you could turn it down a bit … but if you then have that kind of upbringing it's going to make it worse' (Jane, SENDCo/teacher, PRU).*

Research supports associations between environmental adversity and ADHD (Russell, Ford, and Russell 2015; Biederman, Faraone, and Monuteaux 2002; Webb 2013), and indeed focus on building resilience and ameliorating risk may be an effective management approach for children with ADHD who have also experienced environmental adversity (Alvord and Grados 2005).

Environment becoming biology

Several practitioners discussed how things that happen early in a child's life can become biologically hardwired and therefore not alterable by changing the environment:

> *'I think the child's younger years [before age six] as well are so formative in their lives… that I think possibly by the time a child is that much older, that it, the patterns are so entrenched, perhaps hard to tell the difference between what was nature and what was nurture... so fundamentally it actually has become a physical part of how they work' (Ryan, pastoral leader, Primary)*

This appeared to be linked to knowledge of attachment and attachment disorders with which practitioners seem more familiar than ADHD, as Laura says: *'I've done a little bit about attachment disorders and I think there are similarities there' (student support co-ordinator, Secondary).* Practitioners also imply that there is a critical or sensitive period of development (Bornstein 1989), whereby by the age of six they believe that further changes to environment will not change the child's underlying pathology. Anna discusses both of these ideas in combination, putting forward the idea that neurological changes occurring because of poor attachment early in life lead to ADHD behaviours later in childhood *'you know links in your brain that don't happen because of poor attachment…so I do think it's all to do with those first' (teacher, Primary).*

Discussion

Summary

Practitioners in this study represented a range of experience, roles and viewpoints around the topic of ADHD. When discussing what causes ADHD, practitioners endorsed two points of view: that it was either biological in nature, or it was environmentally constructed, often due to an adverse home environment. The views held by practitioners were nuanced and sophisticated, and the range of theories put forward reflects current research literature, despite practitioners' opinions that they lacked knowledge regarding the specific biological causes of ADHD. However, practitioners emphasised more their understanding of theories that have less empirical support (e.g. those of Webb) and were likely to dismiss well-supported theories (e.g. the high heritability of ADHD) as not applying to the majority of children they have worked with. It is important not to consider the lay-theories of practitioners and empirical evidence as representing 'right' or 'wrong'; indeed, they can be viewed as complementary.

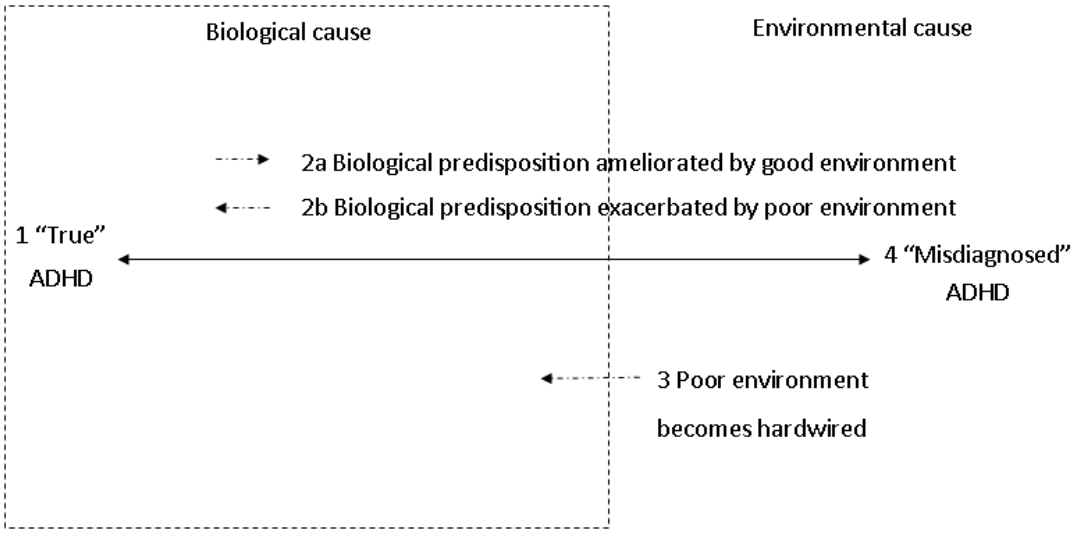
Practitioner theories as evidenced by this study can inform future research directions about the causes of ADHD. Educational practitioners have a wealth of experience working with children with these difficulties, and their understandings could allow epidemiologists to take advantage of expertise of those with direct and personal knowledge of ADHD by incorporating the ideas about causes and nosology into future research designs. In addition this study contributes to understanding dilemmas educational practitioners face when working with children with ADHD and enables us to identify reported gaps in their knowledge.

Further theoretical elaboration

Based on the views of the practitioners around causes of ADHD, we have constructed a model to capture beliefs about the causes of ADHD (see Figure 1.). Theory 1 reflects that severe

ADHD symptoms (in the presence of a good environment) are due to solely biological predisposition; these were considered by practitioners to be 'True' ADHD. At the other extreme (Theory 4), symptoms can be caused entirely by the environment with minimal or no biological contribution; practitioners considered this to be a misdiagnosis of ADHD. Practitioners believe severe adversity early in life can become biologically 'hardwired' (Theory 3); these thoughts were based on practitioners' knowledge of child development and attachment disorders, where early experiences are thought to alter the formation of neural pathways. It would therefore be of interest to explore and further understand whether educational practitioners' causal beliefs moderate their adherence to treatments for children with ADHD.

Figure 1: Practitioners' causal explanations for ADHD



Notes: 1– 'True' ADHD characterized as biologically caused, severe, uncontrolled and rare. 2a– Biological predisposition to ADHD ameliorated by good environment, symptoms are milder. 2b– Biological predisposition to ADHD exacerbated by poor environment, symptoms are more severe. 3–

Poor environment causes symptoms, becomes hardwired and therefore a biological condition. 4– Symptoms caused entirely by poor environment, considered by educational practitioners to be a misdiagnosis of ADHD.

Theories 2a and 2b focus on how the environment affects biological predisposition and encompasses symptom severity. In both 2a and 2b all children with ADHD have a biological predisposition to the constellation of symptoms. This in turn can then be ameliorated (2a) or exacerbated (2b) by the environment that the child grows up in. Most practitioners acknowledged home and parents to be key elements of this, and some mentioned the impact of peers and the school context as other pertinent factors.

How do these beliefs compare to the current empirical literature on ADHD?

ADHD is currently thought to be a highly heritable disorder, with environmental factors impacting on risk and resilience (Faraone et al. 2015). However, recently the idea that there may be two discrete causes for ADHD, or types of ADHD has been forwarded (Webb 2013; Russell, Ford, and Russell 2015); one environmentally caused by extreme adversity and one with biological origins. If this is indeed the case it is of interest that practitioners consider environmentally-caused ADHD to be a 'misdiagnosis' rather than the same disorder with different aetiological pathways. Practitioners do however propose a separate environmental pathway to ADHD, whereby early adversity has negative impacts on the developing brain that lead to symptoms becoming irreversible. Whether or not they would consider this to then be 'True' ADHD is unknown. We suggest that participants' theories around this subject appear to

be based on their understanding of the impact of attachment on development, and the impacts of early problems with attachment on brain development. On the whole however, practitioners were vaguer about biological concepts than environmental. We suggest that this is because educational practitioners feel most comfortable talking about their field of expertise, but also that this reflects their knowledge; practitioners are likely to have more experience of how environmental adversity affects children than knowledge of the specific biological mechanisms of ADHD, thus they draw on their knowledge in order to conceptualise and form an understanding of the causes of ADHD.

Our findings somewhat reflect those of Couture et al. (2003) in that the majority of practitioners felt that 'True' ADHD had a biological cause. However, practitioners in our study rarely reflected on and endorsed societal level explanations for ADHD, unlike those in Couture et al.'s study. The themes 'biological' and 'environmental' also reflect the findings of Hillman (2011) where practitioners' classifications fell into two categories of cause: medical or non-medical. However, unlike Hillman, we found an interaction between these two classifications as some practitioners described ADHD being primarily caused by biological factors but exacerbated by environmental factors, as well as the concern that early adversity may predispose children to develop entrenched behaviours.

The source of information and theory generating among practitioners was often interesting. Because practitioners are aware that the medicines used to treat ADHD work 'in the brain', they reason that ADHD must have some biological root. The interviewer was often asked questions before and after the data collection about how Ritalin works and how it was developed, and practitioners were often surprised when informed that it was discovered to work by chance and not because of an elaborate neurochemical understanding of ADHD (Lange et al. 2010).

Practitioners discussed obtaining information from a variety of sources that they drew upon in order to form their own conceptualisations of the causes of ADHD including parents, media and direct experience, although they considered their knowledge of biological causes of ADHD under-developed.

How practitioners' beliefs about the causes of ADHD align with the school ethos and behavioural management practices may play a role in how the practitioner responds to the individual child (Ajzen and Fishbein 1977). This is supported by one focus group run in a secondary school where the practitioners had a very clear stance on ADHD as a medical disorder. This allowed them to put forward a coherent plan as to how both the school and individual staff could best support any child with this diagnosis whilst allowing for the individual needs of each child. Taken together with the lack of (and thirst for) knowledge of ADHD displayed by practitioners in the study, research and development of accessible psychoeducational programs for practitioners as well as evidence based guidelines for schools are called for.

Strengths and Limitations

This study is the first qualitative study of UK teachers' attitudes and experiences of ADHD. The methodology and recruitment had a variety of strengths; schools of varying provision were included covering the full age range of compulsory education in the UK, and tapping into specialist provisions for children who were not educated within the mainstream setting. We also recruited any educational practitioner who had experience working with children with ADHD, not just teachers. Limitations are that the study was conducted in a relatively small geographical area, and the sample cannot be inferred to be representative of all educational practitioners, so generalisability of findings is limited. However, conceptualisations

of ADHD were validated within other focus groups and interviews within the study, which allows us to tentatively infer that these views may be present in the wider educational community in the UK. Our sample was self-selected, therefore they might not be representative of those who would not volunteer to participate in research or engage in a focus group with colleagues. However, we believe we have managed to capture the views of those with a wide range of experience by including all educational practitioners and by the participation of those with a spectrum of years of experience.

Recommendations for future research

This study has a variety of implications. Firstly, if educational practitioners believe that when a child's ADHD difficulties are seen to be caused by an adverse home life this may be a misdiagnosis of ADHD, they may then be less likely to take the child's problems seriously. However, multiple routes to health outcomes are not unknown. For example diabetes can be caused by both heritable and lifestyle factors: the cause does not influence how we treat individuals. Therefore any child with a diagnosis of ADHD should be able to access treatment. However this may be compromised by the beliefs of educational practitioners if they block access to treatment or stigmatise the child for the perceived cause of their behaviour. Further research would also benefit from extending the ideas and models presented here with both qualitative and quantitative research techniques.

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